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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

In re Application of:

Michael Lester Kerns et al

For: SYNTHESIS OF FUNCTIONALIZED

HIGH VINYL RUBBER

Serial No.: 10/669,223

Filed: September 24, 2003

) Docket No. DN2002-053

) Art Unit: 1713

) Examiner:

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on June 9, 2004.


Mary A. Nicoloff

Commissioner for Patents
Alexandria, VA 22313-1450

Dear Sir:

INFORMATION DISCLOSURE IN COMPLIANCE WITH 37 C.F.R. §1.98

As a means of complying with the duty of disclosure set forth in 37 C.F.R. §1.56, the Applicants are calling the following to the attention of the Patent Office and request that they be considered by the Examiner:

United States Patent 4,843,120

United States Patent 5,137,998

United States Patent 5,047,483

United States Patent 5,272,220

United States Patent 5,239,009

United States Patent 5,061,765

United States Patent 5,405,927

United States Patent 5,654,384

United States Patent 5,620,939

United States Patent 5,627,237

United States Patent 5,677,402

United States Patent 6,140,434

United States Patent 6,627,721

United States Patent 4,022,959

United States Patent 4,696,986

United States Patent 5,906,956

United States Patent 5,562,310

However, the above-listed references may not be prior art under 35 U.S.C. §102 and

this document should not be construed as an admission that any of the above-listed references are prior art within the meaning of 35 U.S.C. §102.

United States Patent 4,843,120 may be relevant to the prosecution of the subject patent application because it discloses that tires having improved performance characteristics can be prepared by utilizing rubbery polymers having multiple glass transition temperatures as the tread rubber. According to United States Patent Number 4,843,120, these polymers are made by polymerizing at least one conjugated diolefin monomer in a first reaction zone at a temperature and under conditions sufficient to produce a first polymeric segment having a glass transition temperature which is between -110°C and -20°C and subsequently continuing said polymerization in a second reaction zone at a temperature and under conditions sufficient to produce a second polymeric segment having a glass transition temperature which is between -20°C and 20°C. Such polymerizations are normally catalyzed with an organolithium catalyst and are normally carried out in an inert organic solvent.

United States Patent 5,137,998 may be relevant to the prosecution of the subject patent application because it discloses a process for preparing a rubbery terpolymer of styrene, isoprene, and butadiene having multiple glass transition temperatures and having an excellent combination of properties for use in making tire treads which comprises: terpolymerizing styrene, isoprene and 1,3-butadiene in an organic solvent at a temperature of no more than about 40°C in the presence of (a) at least one member selected from the group consisting of tripiperidino phosphine oxide and alkali metal alkoxides and (b) an organolithium compound.

United States Patent 5,047,483 may be relevant to the prosecution of the subject patent application because it discloses a pneumatic tire having an outer circumferential tread where said tread is a sulfur cured rubber composition comprised of, based on 100 parts by weight rubber (phr), (A) about 10 to about 90 parts by weight of a styrene, isoprene, butadiene terpolymer rubber (SIBR), and (B) about 70 to about 30 weight percent of at least one of cis 1,4-polyisoprene rubber and cis 1,4-polybutadiene rubber wherein said SIBR rubber is comprised of (1) about 10 to about 35 weight percent bound styrene, (2) about 30 to about 50 weight percent bound isoprene and (3) about 30 to about 40 weight percent bound butadiene and is characterized by having a single glass transition temperature (T_g) which is in the range of about -10°C to about -40°C and, further the said bound butadiene structure contains about 30 to about 40 percent 1,2-vinyl units, the said bound isoprene structure contains about 10 to about 30 percent 3,4-units, and the sum of the percent 1,2-vinyl units of the bound butadiene and the percent 3,4-units of the bound isoprene is in the range of about

40 to about 70 percent.

United States Patent 5,272,220 may be relevant to the prosecution of the subject patent application because it discloses a styrene-isoprene-butadiene rubber which is particularly valuable for use in making truck tire treads which exhibit improved rolling resistance and tread wear characteristics, said rubber being comprised of repeat units which are derived from about 5 weight percent to about 20 weight percent styrene, from about 7 weight percent to about 35 weight percent isoprene, and from about 55 weight percent to about 88 weight percent 1,3-butadiene, wherein the repeat units derived from styrene, isoprene and 1,3-butadiene are in essentially random order, wherein from about 25% to about 40% of the repeat units derived from the 1,3-butadiene are of the cis-microstructure, wherein from about 40% to about 60% of the repeat units derived from the 1,3-butadiene are of the trans-microstructure, wherein from about 5% to about 25% of the repeat units derived from the 1,3-butadiene are of the vinyl-microstructure, wherein from about 75% to about 90% of the repeat units derived from the isoprene are of the 1,4-microstructure, wherein from about 10% to about 25% of the repeat units derived from the isoprene are of the 3,4-microstructure, wherein the rubber has a glass transition temperature which is within the range of about -90°C to about -70°C, wherein the rubber has a number average molecular weight which is within the range of about 150,000 to about 400,000, wherein the rubber has a weight average molecular weight of about 300,000 to about 800,000, and wherein the rubber has an inhomogeneity which is within the range of about 0.5 to about 1.5.

United States Patent 5,239,009 may be relevant to the prosecution of the subject patent application because it reveals a process for preparing a rubbery polymer which comprises: (a) polymerizing a conjugated diene monomer with a lithium initiator in the substantial absence of polar modifiers at a temperature which is within the range of about 5°C to about 100°C to produce a living polydiene segment having a number average molecular weight which is within the range of about 25,000 to about 350,000; and (b) utilizing the living polydiene segment to initiate the terpolymerization of 1,3-butadiene, isoprene, and styrene, wherein the terpolymerization is conducted in the presence of at least one polar modifier at a temperature which is within the range of about 5°C to about 70°C to produce a final segment which is comprised of repeat units which are derived from 1,3-butadiene, isoprene, and styrene, wherein the final segment has a number average molecular weight which is within the range of about 25,000 to about 350,000. .

United States Patent 5,061,765 may be relevant to the prosecution of the subject patent application because it discloses isoprene-butadiene copolymers having high vinyl

contents which can reportedly be employed in building tires which have improved traction, rolling resistance, and abrasion resistance.

United States Patent 5,405,927 may be relevant to the prosecution of the subject patent application because it discloses an isoprene-butadiene rubber which is particularly valuable for use in making truck tire treads, said rubber being comprised of repeat units which are derived from about 20 weight percent to about 50 weight percent isoprene and from about 50 weight percent to about 80 weight percent 1,3-butadiene, wherein the repeat units derived from isoprene and 1,3-butadiene are in essentially random order, wherein from about 3% to about 10% of the repeat units in said rubber are 1,2-polybutadiene units, wherein from about 50% to about 70% of the repeat units in said rubber are 1,4-polybutadiene units, wherein from about 1% to about 4% of the repeat units in said rubber are 3,4-polyisoprene units, wherein from about 25% to about 40% of the repeat units in the polymer are 1,4-polyisoprene units, wherein the rubber has a glass transition temperature which is within the range of about -90°C to about -75°C, and wherein the rubber has a Mooney viscosity which is within the range of about 55 to about 140.

United States Patent 5,654,384 may be relevant to the prosecution of the subject patent application because it discloses a process for preparing high vinyl polybutadiene rubber which comprises polymerizing 1,3-butadiene monomer with a lithium initiator at a temperature which is within the range of about 5°C to about 100°C in the presence of a sodium alkoxide and a polar modifier, wherein the molar ratio of the sodium alkoxide to the polar modifier is within the range of about 0.1:1 to about 10:1; and wherein the molar ratio of the sodium alkoxide to the lithium initiator is within the range of about 0.05:1 to about 10:1.

United States Patent 5,620,939, United States Patent 5,627,237, and United States Patent 5,677,402 may be relevant to the prosecution of the subject patent application because they disclose the use of sodium salts of saturated aliphatic alcohols as modifiers for lithium initiated solution polymerizations.

United States Patent 6,140,434 may be relevant to the prosecution of the subject patent application because it discloses a solution to the problem of recycle stream contamination. United States Patent 6,140,434 is based upon the discovery that metal salts of cyclic alcohols are highly effective modifiers that do not co-distill with hexane or form compounds during steam stripping which co-distill with hexane. Since the boiling points of these metal salts of cyclic alcohols are very high, they do not co-distill with hexane and contaminate recycle streams. United States Patent 6,140,434 may also be relevant to the prosecution of the subject patent application because it specifically discloses a process for

preparing a rubbery polymer having a high vinyl content which comprises: polymerizing at least one diene monomer with a lithium initiator at a temperature which is within the range of about 5°C to about 100°C in the presence of a metal salt of a cyclic alcohol and a polar modifier, wherein the molar ratio of the metal salt of the cyclic alcohol to the polar modifier is within the range of about 0.1:1 to about 10:1; and wherein the molar ratio of the metal salt of the cyclic alcohol to the lithium initiator is within the range of about 0.05:1 to about 10:1.

United States Patent 6,627,721 may be relevant to the prosecution of the subject patent application because it describes a technique for synthesizing functionalized monomers.

United States Patent 4,022,959 and United States Patent 4,696,986 may be relevant to the prosecution of the subject patent application because they describe the utilization of 1,2,3-trialkoxobenzenes and 1,2,4-trialkoxobenzenes as modifiers.

United States Patent 5,906,956 may be relevant to the prosecution of the subject patent application because it reveals a number of sodium alkoxide compounds that can be used in the practice of the subject invention.

United States Patent 5,562,310 may be relevant to the prosecution of the subject patent application because it describes a procedure to metallate the polymer chain and prepare grafted copolymers.

Form PTO-1449 is enclosed herewith.

Respectfully submitted,



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FORM PTO-1440 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	ATTY DOCKET NO. DN2002-053	SERIAL NO. 10/669,223
	APPLICANT (S) Michael Lester Kerns, et al	
	FILING DATE SEPTEMBER 24, 2003	GROUP 1713

U.S. PATENT DOCUMENTS

Examiner Initial	Document Number	Date	Name	Class	Sub-class	Filing Date if Appropriate
	4,843,120	Jun. 27, 1989	Halasa et al.	525	53	
	5,137,998	Aug. 11, 1992	Hsu et al.	526	174	
	5,047,483	Sep. 10, 1991	Halasa et al.	525	237	
	5,272,220	Dec. 21, 1993	Rodgers et al.	525	332.3	
	5,239,009	Aug. 24, 1993	Halasa et al.	525	258	
	5,061,765	Oct. 29, 1991	Hsu et al.	526	141	
	5,405,927	Apr. 11, 1995	Hsu et al.	526	337	
	5,654,384	Aug. 5, 1997	Halasa et al.	526	174	
	5,620,939	Apr. 15, 1997	Halasa et al.	502	154	
	5,627,237	May 6, 1997	Halasa et al.	525	236	
	5,677,402	Oct. 14, 1997	Halasa et al.	526	174	
	6,140,434	Oct. 31, 2000	Halasa et al.	526	174	
	6,627,721	Sept. 30, 2003	Rodewald et al	526	338	
	4,022,959	May 10, 1977	Sommer et al	526	180	
	4,696,986	Sept. 29, 1987	Halasa et al	526	181	
	5,906,956	May 25, 1999	Halasa et al	502	154	
	5,562,310	Oct. 8, 1996	Henry	283	87	

FOREIGN PATENT DOCUMENTS

Examiner Initial	Document Number	Date	Country	Class	Sub-Class	Translation yes no

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

Examiner Initial	
EXAMINER	DATE CONSIDERED:

Examiner: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.